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Dominik Eisert

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EXAMINER

NGUYEN, JOSEPH H

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,551	Applicant(s) EISERT ET AL.	
	Examiner JOSEPH NGUYEN	Art Unit 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/02/2009 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-2 and 14-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Heremans et al. (U.S. Patent No. 6,504,180)

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Regarding claim 1, Heremans et al. discloses in figure 12 a radiation emitting semiconductor device with a multilayer structure comprising an active radiation (light) generating layer 10; a reflective layer 128; a first main area and a second main area remote from the first main area for coupling out the radiation generating in the active radiation generating layer 10, wherein the multilayer structure is an epitaxial layer structure, the semiconductor device is free of a deposition substrate of the multilayer structure; and a region 41 of the multilayer structure that adjoins the second main area of the multilayer structure is patterned one dimensionally. See col. 17, lines 1-24.

Regarding claim 2, Heremans et al. discloses in figure 12 the region 41 of the multilayer structure that adjoins the second main area of the multilayer structure has convex elevations.

Regarding claim 14, Heremans et al. discloses in figure 12 the multilayer structure is applied by its first main area via the reflective layer 128 on a carrier substrate 129.

Regarding claim 15, Heremans et al. discloses in figure 12 the carrier substrate 129 serves as a contact area of the semiconductor device as a circuit can be further attached to this carrier substrate.

Regarding claim 16, Heremans et al. discloses in figure 12 a conductive transparent layer 123 is applied on the second main area of the multilayer structure.

Regarding claim 17, Heremans et al. discloses in figure 12 a transparent protective layer 125 (polyimide is transparent material) is applied on the second main area of the multilayer structure.

4. Claims 18-21, 35 and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Ono et al. (U.S. Patent No. 4,122,486).

Regarding claim 18, Ono et al. discloses in figure 2c a radiation emitting semiconductor device comprising a multiplayer structure comprising an active, radiation generating layer; a reflective layer 29 (Au is reflective material); a first main area coupled to the reflective layer; a second main area remote from the first main area for coupling the radiation generating in the active, radiation generating layer; and a transparent layer 22 disposed between the first main area and the reflective layer 29, said transparent layer being patterned one dimensionally, wherein the multiplayer structure is an epitaxial layer structure and the semiconductor device is free of a deposition substrate of the multiplayer structure. See col. 4, lines 1-20.

Regarding claim 19, Ono et al. discloses in figure 2c the transparent layer 22 is a transparent conductive material (column 4, lines 10-12).

Regarding claim 20, Ono et al. discloses in figure 2c the transparent layer 22 between the first main area of the multilayer structure and the reflective layer 29 or interface comprises convex elevations.

Regarding claim 21, Ono et al. discloses in figure 2c the elevations have the form of truncated pyramids or truncated cones or a trapezoidal cross-sectional form.

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Regarding claim 35, Ono et al. discloses in figure 2c the reflective layer 29 is substantially planar.

Regarding claim 37, Ono discloses in figure 2c the active, radiation generating layer is a continuous layer, and the transparent layer comprises a plurality of elevations that overlap with the active, radiation generating layer.

5. Claims 18-20, 30, 31, 34 and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Heinen (U.S. Patent No. 6,111,272).

Regarding claim 18, Heinen discloses in figure 1 a radiation emitting semiconductor device comprising a multilayer structure comprising an active, radiation generating layer 12; a reflective layer 4; a first main area 14 coupled to the reflective layer 4; a second main area 14' remote from the first main area for coupling the radiation generated in the active, radiation generating layer; and a transparent layer 11 disposed between the first main area and the reflective layer 4, said transparent layer being patterned one or two dimensionally, wherein the multilayer structure is an epitaxial layer structure, and the semiconductor device is free of a deposition substrate of the multilayer structure. See col. 8.

Regarding claim 19, Heinen discloses in figure 1 the transparent layer 11 is conductive.

Regarding claim 20, Heinen discloses in figure 1 the transparent layer 11 between the first main area of the multilayer structure and the reflective layer 4.

Regarding claim 30, Heremans et al. discloses in figure 1 the reflective layer 4 is applied on a carrier substrate 2.

Regarding claim 31, Heremans et al. discloses in figure 1 the reflective layer 4 serves as a contact area of the semiconductor device.

Regarding claim 34, Heinen discloses the multilayer structure is based on GaN (col. 5, lines 53-56).

Regarding claim 35, Heinen discloses in figure 1 the reflective layer 4 is substantially planar.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3, 4, 12 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heremans et al. in view of Lester (U.S. Patent No. 6,291,839).

Regarding claims 3-4, Heremans et al. discloses in figure 1 substantially all the structure set forth in claims 3-4 except for the elevations having the form of truncated cones or cones. However, Lester discloses in figure 5 the elevations 16 having the form of truncated cones or cones so as to effectively scatter light in the semiconductor and thus increase light emission efficiency (ABSTRACT). In view of such teaching, it would have been obvious at the time of the present invention to modify Heremans et al. by

including the elevations having the form of truncated cones or cones so as to effectively scatter light in the semiconductor and thus increase light emission efficiency.

Regarding claim 12, Heremans et al. discloses in figure 2c substantially the structure set forth in claim 12 except for the reflective layer having a reflectivity of at least 70%. However, Lester discloses in col. 2, lines 65-66 the reflective layer 9 is having a reflectivity of at least 70%. In view of such teaching, it would have been obvious at the time of the present invention to modify Heremans et al. by including the reflective layer having a reflectivity of at least 70% so as to improve light emission efficiency.

Regarding claim 33, Heremans et al. discloses substantially all the structure set forth in claim 33 except for the multilayer structure being based on GaN. However, Lester discloses in col. 2, line 9 the multilayer structure is based on GaN. In view of such teaching, it would have been obvious at the time of the present invention to modify Heremans et al. by including the multilayer structure being based on GaN so as to generate a blue light for a specific application because GaN is well known to emit blue light.

8. Claims 5-11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heremans et al.

Regarding claim 5, Heremans et al. discloses in figure 1 the elevations have the form of truncated cones, not of a circle segment cross sectional form as claimed. However, In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966), the Court held that the changes in shape was a matter of choice which a person of ordinary skill in the art

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would have found obvious absent persuasive evidence (MPEP 2144.04, page 2100-137, Rev. 5, August, 2006). Therefore, it would have been obvious at the time of the present invention to modify Heremans et al. by including the elevation having the circle segment cross sectional form, since this involves only routine skill in the art.

Regarding claims 6-7, Heremans et al. discloses in figure 1 the elevations have an aperture angle of certain degree(s), not necessarily between approximately 30° and approximately 70° or between approximately 40° and approximately 50°. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Heremans et al. by including the elevations having an aperture angle of between approximately 30° and approximately 70° or between approximately 40° and approximately 50°, since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 8, Heremans et al. discloses in figure 1 the elevations have certain heights. Heremans et al. does not disclose the height of the elevations being at least as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Heremans et al. by including the height of the elevations being at least as large as the height of the plane region of the multilayer structure between the active, radiation

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generating layer and the elevation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 9, Heremans et al. discloses in figure 1 the elevations have certain heights. Heremans et al. does not disclose the height of the elevations being approximately twice as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Heremans et al. by including the height of the elevations being approximately twice as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 10, Heremans et al. discloses in figure 1 the elevations have grid dimension. Heremans et al. does not disclose the grid dimension of the elevations being at most approximately five times as large as the height of the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Heremans et al. by including the grid dimension of the elevations being at most approximately five times as large as the height of the elevations, since it has been held that discovering an optimum value of a result effective

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variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 11, Heremans et al. discloses in figure 1 the elevations have grid dimension. Heremans et al. does not disclose the grid dimension of the elevations being at most approximately three times as large as the height of the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Heremans et al. by including the grid dimension of the elevations being at most approximately three times as large as the height of the elevations, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 13, Heremans et al., however, does not exclusively disclose the degree of reflection of at least 85%. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Heremans et al. by including the layer coupled to the first main area of the multilayer structure having a degree of reflection of at least 85%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 22-29 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono et al.

Regarding claims 22-23, Ono et al. discloses in figure 2c the elevations have an aperture angle of certain degree(s), not necessarily between approximately 30° and approximately 70° or between approximately 40° and approximately 50°. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ono et al. by including the elevations having an aperture angle of between approximately 30° and approximately 70° or between approximately 40° and approximately 50°, since it has been held that where the general conditions of a claim are disclosed in the prior art discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Regarding claim 24, Ono et al. discloses in figure 2c the elevations have certain heights. Heremans et al. does not disclose the height of the elevations being at least as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ono et al. by including the height of the elevations being at least as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 25, Ono et al. discloses in figure 2c the elevations have certain heights. Ono et al. does not disclose the height of the elevations being approximately

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twice as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ono et al. by including the height of the elevations being approximately twice as large as the height of the plane region of the multilayer structure between the active, radiation generating layer and the elevation, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 26, Ono et al. discloses in figure 2c the elevations have grid dimension. Ono et al. does not disclose the grid dimension of the elevations being at most approximately five times as large as the height of the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ono et al. by including the grid dimension of the elevations being at most approximately five times as large as the height of the elevations, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 27, Ono et al. discloses in figure 2c the elevations have grid dimension. Heremans et al. does not disclose the grid dimension of the elevations being at most approximately three times as large as the height of the elevations. However, it would have been obvious to one having ordinary skill in the art at the time of the

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invention was made to modify Ono et al. by including the grid dimension of the elevations being at most approximately three times as large as the height of the elevations, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claims 28-29, Ono et al. does not disclose the degree of reflection of at least 70% or 85%. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ono et al. by including the layer coupled to the first main area of the multilayer structure having a degree of reflection of at least 70% or at least 85%, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 36, Ono et al. discloses in figure 2c substantially all the structure set forth in claim except for the transparent layer comprising first and second regions, the first region having a thickness greater than that of the second region. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify Ono et al. by including the transparent layer comprising first and second regions, the first region having a thickness greater than that of the second region, since it has been held that discovering an optimum value of a

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result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ono et al. in view of Yamazaki et al. (U.S. Patent No. 6,515,310).

Regarding claim 32, Ono et al. discloses in figure 2c substantially all the structure set forth in claim 32 except a transparent protective layer being applied on the second main area of the multilayer structure. However, Yamazaki et al. disclose in figure 3A a semiconductor device comprises a transparent protective layer 305 applied on top surface of the multilayer structure to protect the device. In view of such teaching, it would have been obvious at the time of the present invention to modify Ono et al. by including a transparent protective layer being applied on the second main area of the multilayer structure to protect the device.

Response to Arguments

11. Applicant's arguments with respect to claims 1-37 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 8:30 am- 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

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supervisor, Ken Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/J. N./

Examiner, Art Unit 2815

/Kenneth A Parker/

Supervisory Patent Examiner, Art Unit 2815